

## SEQUENCE LISTING

<110> Rioux, Stephane  
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<120> POLYPEPTIDES OF STREPTOCOCCUS PYOGENES

<130> 484112.436USPC

<140> 10/568,737

<141> 2004-08-16

<150> PCT/CA2004/001510

<151> 2004-08-16

<150> US 60/495,094

<151> 2003-08-15

<160> 46

<170> PatentIn version 3.3

<210> 1

<211> 537

<212> DNA

<213> Streptococcus pyogenes

<400> 1

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attgaaatca aagttgaagg gactgaaatc acagttgtac gtcttaacga ctcaaaagaa      180
atgaaaacaa tccatggtac aacccggtgt aacttgaata acatggttgt aggtgtttct      240
gaagggtttc aaaaagatct tgaaatgaag ggtgtcgggt accgtgctca acttcaaggt      300
actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga      360
attactttca ctggttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt      420
gttgggtcaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa      480
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<210> 2

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<212> PRT

<213> Streptococcus pyogenes

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[illegible]

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&lt;212&gt; PRT

&lt;213&gt; Streptococcus pyogenes

&lt;400&gt; 4

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      20      25      30
Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
      35      40      45
Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
      50      55      60
Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65      70      75      80
Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
      85      90      95
Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
      100     105     110
Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
      115     120     125
Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
      130     135     140
Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145     150     155     160
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
      165     170     175
Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
      180     185     190
Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Thr Glu Lys Gly
      195     200     205
Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
      210     215     220
Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225     230     235     240
Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
      245     250     255
Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Gly Gln Lys Val
      260     265     270
Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
      275     280     285
Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly
      290     295     300
Gln Gly Gly Asn Asp Gln Gln Asp Asn Pro Asn Gln Ala Lys Phe Pro
305     310     315     320
Tyr Val Ile Glu Leu Asp Gln Ser Asp Lys Gln Pro Leu Ile Gly Ser
      325     330     335
His Thr Tyr Val Asn Val Leu Asn Asn Val Pro Glu Ala Gly Lys Ile
      340     345     350
Val Leu Lys Glu Thr Phe Thr Met Ala Glu Asn Gly Lys Thr Tyr Val
      355     360     365
Trp Lys Val Asp Lys Asn Lys Val Lys Lys Gln Glu Ile Lys Thr Lys
      370     375     380
Pro Phe Ser Lys Gly Tyr Val Glu Val Thr Ser Gly Leu Thr Met Gln
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<212> DNA
<213> Streptococcus pyogenes
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gttgctgtgg	ttgatatctg	tgaccgttta	aatttagacc	tcgttggggg	ttgtgatagt		180
aaattatata	cccttcctaa	acgctatgat	gctgttaagc	gtgtggggtt	acccatgaat		240
cctgatatag	agttgattgc	ttctttgaaa	ccaacttgga	ttttgagtc	caattcctta		300
caagaagatt	tggaacccaa	gtatcaaaaa	ttggatactg	agtatgggtt	tttgaactta		360
cgaagtgttg	agggcatgta	ccagtcatt	gatgatttag	ggaacctttt	ccaacgtcaa		420
caagaagcaa	aagaattgcg	ccagcaatac	caggactatt	atcgtgcttt	ccaagctaaa		480
cgtaagggga	agaaaaagcc	taaagtgctt	attccttatgg	gcttgccagg	tagttatttg		540
gtggcgacga	accaatctta	tgtagggaat	cttttggaact	tggcaggtgg	tgagaatggt		600
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cctgacttga	ttttacgaac	agctcatgcc	attccagaca	aggtaaaagt	gatgtttgac		720
aaagaatttg	ctgaaaatga	tatttgaaa	catttcacgg	cagtcacagga	agggaaagtc		780
tatgatttgg	acaataccct	gtttggcatg	agtgctaaat	tgaactacc	agaagccttg		840
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<210>      6
<211>     294
<212>     PRT
<213>    Streptococcus pyogenes
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			20					25					30			
Gln	Gln	Arg	Ile	Val	Ala	Thr	Ser	Val	Ala	Val	Val	Asp	Ile	Cys	Asp	
		35					40					45				
Arg	Leu	Asn	Leu	Asp	Leu	Val	Gly	Val	Cys	Asp	Ser	Lys	Leu	Tyr	Thr	
	50					55					60					
Leu	Pro	Lys	Arg	Tyr	Asp	Ala	Val	Lys	Arg	Val	Gly	Leu	Pro	Met	Asn	
65				70						75					80	
Pro	Asp	Ile	Glu	Leu	Ile	Ala	Ser	Leu	Lys	Pro	Thr	Trp	Ile	Leu	Ser	
				85					90					95		
Pro	Asn	Ser	Leu	Gln	Glu	Asp	Leu	Glu	Pro	Lys	Tyr	Gln	Lys	Leu	Asp	
			100					105					110			
Thr	Glu	Tyr	Gly	Phe	Leu	Asn	Leu	Arg	Ser	Val	Glu	Gly	Met	Tyr	Gln	
		115					120					125				
Ser	Ile	Asp	Asp	Leu	Gly	Asn	Leu	Phe	Gln	Arg	Gln	Gln	Glu	Ala	Lys	
	130					135					140					
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145				150						155					160	

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                                   180                                  185                                  190  
 Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe  
                                   195                                  200                                  205  
 Leu Ser Ala Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile  
                                   210                                  215                                  220  
 Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp  
 225                                  230                                  235                                  240  
 Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys  
                                   245                                  250                                  255  
 Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala  
                                   260                                  265                                  270  
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<220>  
 <223> Oligonucleotide primer

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34

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 <212> DNA  
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29

<210> 9  
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31

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<210> 16  
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 <220>  
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 <400> 19  
 gcgatccga atcagcaccc taaaacgg 28

<210> 20  
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 <400> 20  
 ccgtcgacgg atgatctccc acgtggtc 28

<210> 21  
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 <212> DNA  
 <213> Streptococcus pyogenes  
  
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 attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180  
 atgaaaacaa tccatggtag aaccctgtgt aacttgaata acatgggtgt aggtgtttct 240  
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 actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360  
 attacktttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420  
 gtttgtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480  
 gggatccgtt acgttgggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 22  
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 Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr  
 35 40 45



Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile  
 50 55 60  
 His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser  
 65 70 75 80  
 Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala  
 85 90 95  
 Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln  
 100 105 110  
 Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro  
 115 120 125  
 Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr  
 130 135 140  
 Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys  
 145 150 155 160  
 Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr  
 165 170 175  
 Gly Lys

<210> 23  
 <211> 537  
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 <213> Streptococcus pyogenes

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 attgaaatca aagttgaagg gactgaaatc acagttgtac gtcctaacga ctcaaaagaa 180  
 atgaaaacaa tccatggtac aaccctgtgct aacttgaata acatggttgt aggtgtttct 240  
 gaaggtttca aaaaagatct tgaaatgaag ggtgtcgggt accgtgctca acttcaagggt 300  
 actaaacttg tcctttcagt aggtaaatct caccaagacg aagttgaagc tccagaagga 360  
 attactttca ctgttgctaa cccaacttca atctcagttg aaggaatcaa caaagaagtt 420  
 gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480  
 gggatccgtt acgttggtga atacgtacgc cttaaagaag gtaaaacagg taaataa 537

<210> 24  
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 <213> Streptococcus pyogenes

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 20 25 30  
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 35 40 45  
 Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile  
 50 55 60  
 His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser  
 65 70 75 80  
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<213> Streptococcus pyogenes
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atgaaaacaa	tccatgggac	aaccgcgtgt	aacttgaata	acatggttgt	aggtgtttct		240
gaagggtttca	aaaaagatct	tgaaatgaag	gggtgtcgggt	accgcgctca	acttcaagggt		300
actaaacttg	tccttttcagt	aggtaaattct	caccaagacg	aagttgaagc	tccagaagga		360
attactttca	ctgttgctaa	cccaacttca	atctcagttg	aaggaatcaa	caaagaagtt		420
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<210> 26
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<212> PRT
<213> Streptococcus pyogenes
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			20					25					30		
Leu	Thr	Arg	Glu	Phe	Asn	Lys	Asn	Ile	Glu	Ile	Lys	Val	Glu	Gly	Thr
		35					40					45			
Glu	Ile	Thr	Val	Val	Arg	Pro	Asn	Asp	Ser	Lys	Glu	Met	Lys	Thr	Ile
	50					55					60				
His	Gly	Thr	Thr	Arg	Ala	Asn	Leu	Asn	Asn	Met	Val	Val	Gly	Val	Ser
65				70					75						80
Glu	Gly	Phe	Lys	Lys	Asp	Leu	Glu	Met	Lys	Gly	Val	Gly	Tyr	Arg	Ala
			85					90						95	
Gln	Leu	Gln	Gly	Thr	Lys	Leu	Val	Leu	Ser	Val	Gly	Lys	Ser	His	Gln
			100					105					110		
Asp	Glu	Val	Glu	Ala	Pro	Glu	Gly	Ile	Thr	Phe	Thr	Val	Ala	Asn	Pro
		115					120					125			
Thr	Ser	Ile	Ser	Val	Glu	Gly	Ile	Asn	Lys	Glu	Val	Val	Gly	Gln	Thr
	130					135					140				
Ala	Ala	Tyr	Ile	Arg	Ser	Leu	Arg	Ser	Pro	Glu	Pro	Tyr	Lys	Gly	Lys
145					150				155						160

Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr  
                                   165                                  170                                  175  
 Gly Lys

<210> 27  
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 <213> Streptococcus pyogenes

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 atgaaaacaa tccatggtag aaccctgtgct aacttgaata acatggttgt aggtgtttct 240  
 gaaggtttca aaaaagatct tgaaatgaag ggtgtcgggt accgtgctca acttcaaggt 300  
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 gttggtcaaa cagctgctta catccgtagc ttgcgttcac cagagcctta caaaggcaaa 480  
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<210> 28  
 <211> 178  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 28  
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                                   20                                  25                                  30  
 Leu Thr Arg Glu Phe Asn Lys Asn Ile Glu Ile Lys Val Glu Gly Thr  
                                   35                                  40                                  45  
 Glu Ile Thr Val Val Arg Pro Asn Asp Ser Lys Glu Met Lys Thr Ile  
                                   50                                  55                                  60  
 His Gly Thr Thr Arg Ala Asn Leu Asn Asn Met Val Val Gly Val Ser  
 65                                  70                                  75                                  80  
 Glu Gly Phe Lys Lys Asp Leu Glu Met Lys Gly Val Gly Tyr Arg Ala  
                                   85                                  90                                  95  
 Gln Leu Gln Gly Thr Lys Leu Val Leu Ser Val Gly Lys Ser His Gln  
                                   100                                  105                                  110  
 Asp Glu Val Glu Ala Pro Glu Gly Ile Thr Phe Thr Val Ala Asn Pro  
                                   115                                  120                                  125  
 Thr Ser Ile Ser Val Glu Gly Ile Asn Lys Glu Val Val Gly Gln Thr  
                                   130                                  135                                  140  
 Ala Ala Tyr Ile Arg Ser Leu Arg Ser Pro Glu Pro Tyr Lys Gly Lys  
 145                                  150                                  155                                  160  
 Gly Ile Arg Tyr Val Gly Glu Tyr Val Arg Leu Lys Glu Gly Lys Thr  
                                   165                                  170                                  175  
 Gly Lys

<210> 29  
 <211> 1269  
 <212> DNA

## &lt;213&gt; Streptococcus pyogenes

&lt;400&gt; 29

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tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat      180
atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac      240
tcaagtaaaag gagaagtcaa agaggtcttt gttaaaaaag gcgatgttgt caaagtagga      300
caacccttgt ttagctatga aacgtcacag cggttaacgg ctcaaagttc agaatttgat      360
gttcaaacca aagccaatca gctccaagtt gctaaaacca atgcagcatt gaagtgggaa      420
acctacaatc gcaaggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca      480
gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc      540
gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaata      600
gctactgcca caacggaaaa aggtaaaacta gagtatgaca ccgttaagtc agacaccgca      660
ggaaccattg ttagtctaaa tactgatttg ccaaataaat caaaatccaa aaaagaaaaat      720
gaaactttta tggaaaattat cgacaaatca aaaatgtagt tcaaaggtaa cattagttaa      780
tttgaccgtg acaagttaaa aatcgggtcaa aaagtcgaag tgattgaccg caaagacaac      840
tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc      900
caaggtcaag gccaaaggtg caatgaccaa caagataatc caaaccaagc aaaattccct      960
tatgttattg aacttgacca atcagacaag cagccactca ttggctcaca cacctatggt     1020
aatgtactca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg     1080
gcagaaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaaggtcaa aaaacaagaa     1140
atcaagacta agcccttctc aaaaggttat gttgaggtaa caagtggctt gactatgcaa     1200
gataagattg ctcagccgct tcctggcatg aaagacggta tggaggtagg aagtattggt     1260
aaaccttaa                                     1269

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&lt;210&gt; 30

&lt;211&gt; 422

&lt;212&gt; PRT

## &lt;213&gt; Streptococcus pyogenes

&lt;400&gt; 30

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Met Phe Gln Leu Arg Lys Lys Met Thr Arg Lys Gln Leu Ala Leu Leu
1          5          10          15
Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Ser Tyr Leu Ile Met
20          25          30
Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
35          40          45
Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
50          55          60
Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65          70          75          80
Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
85          90          95
Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
100          105          110
Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
115          120          125
Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
130          135          140
Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145          150          155          160
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser

```

[illegible]

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<210> 31
<211> 1269
<212> DNA
<213> Streptococcus pyogenes
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[illegible]

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tttgaccgtg acaagttaaa aatcgggtcaa aaagtcgaag tgattgaccg caaagacaac      840
tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc      900
caagggtcaag gccaagggtgg caatgaccaa caagataatc caaaccaagc aaaattccct      960
tatgttattg aacttgacca atcagacaag cagccactca ttggctcaca cacctatggt      1020
aatgtactca acaatgttcc agaagctggc aagatcgtat tgaaagaaac ctttacaatg      1080
gcagaaaaatg gaaaaaaccta tgtgtggaaa gttgataaaa acaagggtcaa aaaacaagaa      1140
atcaagacta agcccttctc aaaagggttat gttgaggtaa caagtggctt gactatgcaa      1200
gataagattg ctcagccgct tcctggcatg aaagacggta tggaggtagg aagtattggt      1260
aaaccttaa                                     1269

```

```

<210> 32
<211> 422
<212> PRT
<213> Streptococcus pyogenes

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<400> 32
Met Phe Gln Leu Arg Lys Lys Met Thr Arg Lys Gln Leu Ala Leu Leu
1          5          10          15
Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Ser Tyr Leu Ile Met
          20          25          30
Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala
          35          40          45
Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr
          50          55          60
Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp
65          70          75          80
Ser Ser Lys Gly Glu Val Lys Glu Val Phe Val Lys Lys Gly Asp Val
          85          90          95
Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu
          100          105          110
Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu
          115          120          125
Gln Val Ala Lys Thr Asn Ala Ala Leu Lys Trp Glu Thr Tyr Asn Arg
          130          135          140
Lys Val Asn Glu Ile Asn Thr Leu Lys Ser Arg Tyr Asn Thr Ala Pro
145          150          155          160
Asp Glu Ser Leu Leu Glu Gln Ile Arg Ser Ala Glu Asp Ser Val Ser
          165          170          175
Gln Ala Leu Ser Asp Ala Lys Thr Ala Asp Ser Asp Val Lys Thr Ala
          180          185          190
Gln Ile Glu Leu Asp Lys Ala Asn Ala Thr Ala Thr Thr Glu Lys Gly
          195          200          205
Lys Leu Glu Tyr Asp Thr Val Lys Ser Asp Thr Ala Gly Thr Ile Val
          210          215          220
Ser Leu Asn Thr Asp Leu Pro Asn Gln Ser Lys Ser Lys Lys Glu Asn
225          230          235          240
Glu Thr Phe Met Glu Ile Ile Asp Lys Ser Lys Met Leu Val Lys Gly
          245          250          255
Asn Ile Ser Glu Phe Asp Arg Asp Lys Leu Lys Ile Gly Gln Lys Val
          260          265          270
Glu Val Ile Asp Arg Lys Asp Asn Ser Lys Lys Trp Thr Gly Lys Val
          275          280          285
Thr Gln Val Gly Asn Leu Lys Ala Glu Glu Lys Gly Gln Gly Gln Gly

```

290		295		300
Gln Gly Gly Asn Asp	Gln Gln Asp Asn Pro	Asn Gln Ala Lys Phe Pro		
305	310	315		320
Tyr Val Ile Glu Leu Asp	Gln Ser Asp Lys Gln	Pro Leu Ile Gly Ser		
	325	330		335
His Thr Tyr Val Asn Val	Leu Asn Asn Val	Pro Glu Ala Gly Lys Ile		
	340	345		350
Val Leu Lys Glu Thr Phe Thr	Met Ala Glu Asn Gly	Lys Thr Tyr Val		
	355	360		365
Trp Lys Val Asp Lys Asn	Lys Val Lys Lys Gln	Glu Ile Lys Thr Lys		
	370	375		380
Pro Phe Ser Lys Gly Tyr	Val Glu Val Thr Ser	Gly Leu Thr Met Gln		
385	390	395		400
Asp Lys Ile Ala Gln Pro	Leu Pro Gly Met Lys	Asp Gly Met Glu Val		
	405	410		415
Gly Ser Ile Val Lys Pro				
	420			

<210> 33  
 <211> 1269  
 <212> DNA  
 <213> Streptococcus pyogenes

<400> 33  
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 ttgacctgtg tggttggtgg tagctacttg ataatgaacc atcaacaaca agaagttgtc 120  
 tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180  
 atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaatcgac 240  
 tcaagtaaaag gagaagtcaa agaggtcttt gtcaaaaaag gcgatgttgt caaagtagga 300  
 caacccttgt ttagctatga aacgtcacag cgggttaacgg ctcaaagttc agaatttgat 360  
 gttcaaaacca aagccaatca actccaagtt gctaaaacca atgcagcatt gaagtgggaa 420  
 acctacaatc gcaagggtcaa tgaaatcaac accctaaaat ctcgctacaa cactgcacca 480  
 gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatccca agcactaagc 540  
 gatgccaaaa cagcagatag cgatgtcaaa accgctcaa tccaactcga taaagctaat 600  
 gctactgcca caatggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660  
 ggaaccattg ttagcctaaa tactgatttg ccaaataaat caaatccaa aaaagaaaat 720  
 gaaactttta tggaaattat cgacaaatca aaaatgtag tcaaaggtaa catcagttaa 780  
 tttgaccgtg acaagttaaa aatcgatcaa aaagtcgaag tgattgaccg caaagacaac 840  
 tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900  
 caagggtcaag gccaagggtg caatgaccaa caagacaatc caaaccaagc aaaattccct 960  
 tatgttatcg aacttgacca atcagacaag cagccactca ttggctcaca cacctatggt 1020  
 aatgtgctca acaatgttcc agaagctggc aagatcgat tgaaagaaac ctttacaatg 1080  
 gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaagggtcaa aaaacaagaa 1140  
 atcaagacta agcccttctc aaaaggttat gttgaggtga caagtggctt gactatgcaa 1200  
 gataagattg ctgagccgct tcttgccatg aaagacggtg tggaggtagg aagtattggt 1260  
 aaaccttaa 1269

<210> 34  
 <211> 422  
 <212> PRT  
 <213> Streptococcus pyogenes

[illegible]



420

<210> 35  
 <211> 1269  
 <212> DNA  
 <213> *Streptococcus pyogenes*

<400> 35  
 atgtttcagt taagaaaaaa aatgacgcgc aaacaattag ccttggtgag tgctggagtg 60  
 ttgacctgtg tggttggtgg tacctacttg ataatagaatc atcaacaaca agaaattgtc 120  
 tctagtgtca acaaagtaaa agccttaacc ataaaagaag ccatggaaca aggaaaagat 180  
 atcagcttga ccttagctgg cgaagtaaca gctaacaaca gcagcaaagt caaaatcgac 240  
 tcaagtaaag gagaagtcaa agatgtcttt gtcaaaaaag gcgatggtgt caaagtagga 300  
 caacccttgt ttagctatga aacgtcacaa cggttaacgg ctcaaagttc agaatttgat 360  
 gttcaaacca aagccaatca actccaagtt gctaaaacca atgcagcatt gaagtgggaa 420  
 acctacaatc gcaaggtcaa tgaaatcaat accctaaaat ctcgctacaa cactgcacca 480  
 gatgagagct tactagagca aattcgcagc gcagaagaca gtgtatctca agcactaagc 540  
 gatgccaaaa cagcagatag cgatgtcaaa accgctcaaa tcgaactcga taaagctaata 600  
 gctactgccg caacggaaaa aggtaaacta gagtatgaca ccgttaagtc agacaccgca 660  
 ggaaccattg ttagtctaaa tactgatttg ccaaataaat caaaatccaa aaaagaaaat 720  
 gaaactttta tggaaattat cgacaaatca aaaatgtagg tcaaaggtaa catcagtga 780  
 tttgaccgtg acaagttaaa aatcgatcaa aaagtcgaag tgattgaccg caaagacaac 840  
 tctaaaaaat ggactggaaa agtaacccaa gttggcaacc tcaaagcaga ggaaaaaggc 900  
 caaggtcaag gccaaaggtg caatgaccaa caagataatc caaaccaagc aaaattccct 960  
 tatgttatcg aacttgacca atcagacaag cagccactca ttggttcaca cacctatggt 1020  
 aatgtgtctca acaatgttcc agaagctggc aagatcgat tgaaagaaac ctttacaatg 1080  
 gcagaaaatg gaaaaaccta tgtgtggaaa gttgataaaa acaaggtcaa aaaacaagaa 1140  
 atcaagacta agcccttctc aaaagggtat gttgagggtga caagcggctt gactatgcaa 1200  
 gataagattg ctccagccgct tcctggcatg aaagacggta tggaggtagg aagtattggt 1260  
 aaaccttaa 1269

<210> 36  
 <211> 422  
 <212> PRT  
 <213> *Streptococcus pyogenes*

<400> 36  
 Met Phe Gln Leu Arg Lys Lys Met Thr Arg Lys Gln Leu Ala Leu Leu  
 1 5 10 15  
 Ser Ala Gly Val Leu Thr Cys Val Val Gly Gly Thr Tyr Leu Ile Met  
 20 25 30  
 Asn His Gln Gln Gln Glu Ile Val Ser Ser Val Asn Lys Val Lys Ala  
 35 40 45  
 Leu Thr Ile Lys Glu Ala Met Glu Gln Gly Lys Asp Ile Ser Leu Thr  
 50 55 60  
 Leu Ala Gly Glu Val Thr Ala Asn Asn Ser Ser Lys Val Lys Ile Asp  
 65 70 75 80  
 Ser Ser Lys Gly Glu Val Lys Asp Val Phe Val Lys Lys Gly Asp Val  
 85 90 95  
 Val Lys Val Gly Gln Pro Leu Phe Ser Tyr Glu Thr Ser Gln Arg Leu  
 100 105 110  
 Thr Ala Gln Ser Ser Glu Phe Asp Val Gln Thr Lys Ala Asn Gln Leu

	115		120		125										
Gln	Val	Ala	Lys	Thr	Asn	Ala	Ala	Leu	Lys	Trp	Glu	Thr	Tyr	Asn	Arg
	130					135					140				
Lys	Val	Asn	Glu	Ile	Asn	Thr	Leu	Lys	Ser	Arg	Tyr	Asn	Thr	Ala	Pro
145					150					155					160
Asp	Glu	Ser	Leu	Leu	Glu	Gln	Ile	Arg	Ser	Ala	Glu	Asp	Ser	Val	Ser
			165						170					175	
Gln	Ala	Leu	Ser	Asp	Ala	Lys	Thr	Ala	Asp	Ser	Asp	Val	Lys	Thr	Ala
		180						185					190		
Gln	Ile	Glu	Leu	Asp	Lys	Ala	Asn	Ala	Thr	Ala	Ala	Thr	Glu	Lys	Gly
	195						200					205			
Lys	Leu	Glu	Tyr	Asp	Thr	Val	Lys	Ser	Asp	Thr	Ala	Gly	Thr	Ile	Val
	210					215					220				
Ser	Leu	Asn	Thr	Asp	Leu	Pro	Asn	Gln	Ser	Lys	Ser	Lys	Lys	Glu	Asn
225					230					235					240
Glu	Thr	Phe	Met	Glu	Ile	Ile	Asp	Lys	Ser	Lys	Met	Leu	Val	Lys	Gly
			245					250						255	
Asn	Ile	Ser	Glu	Phe	Asp	Arg	Asp	Lys	Leu	Lys	Ile	Asp	Gln	Lys	Val
		260					265					270			
Glu	Val	Ile	Asp	Arg	Lys	Asp	Asn	Ser	Lys	Lys	Trp	Thr	Gly	Lys	Val
	275					280						285			
Thr	Gln	Val	Gly	Asn	Leu	Lys	Ala	Glu	Glu	Lys	Gly	Gln	Gly	Gln	Gly
	290					295					300				
Gln	Gly	Gly	Asn	Asp	Gln	Gln	Asp	Asn	Pro	Asn	Gln	Ala	Lys	Phe	Pro
305			310						315						320
Tyr	Val	Ile	Glu	Leu	Asp	Gln	Ser	Asp	Lys	Gln	Pro	Leu	Ile	Gly	Ser
			325						330					335	
His	Thr	Tyr	Val	Asn	Val	Leu	Asn	Asn	Val	Pro	Glu	Ala	Gly	Lys	Ile
		340						345					350		
Val	Leu	Lys	Glu	Thr	Phe	Thr	Met	Ala	Glu	Asn	Gly	Lys	Thr	Tyr	Val
	355						360					365			
Trp	Lys	Val	Asp	Lys	Asn	Lys	Val	Lys	Lys	Gln	Glu	Ile	Lys	Thr	Lys
	370					375					380				
Pro	Phe	Ser	Lys	Gly	Tyr	Val	Glu	Val	Thr	Ser	Gly	Leu	Thr	Met	Gln
385				390						395					400
Asp	Lys	Ile	Ala	Gln	Pro	Leu	Pro	Gly	Met	Lys	Asp	Gly	Met	Glu	Val
			405					410						415	
Gly	Ser	Ile	Val	Lys	Pro										
			420												

<210> 37  
 <211> 885  
 <212> DNA  
 <213> Streptococcus pyogenes

<400> 37	
atgataaaac gatgtaaagg aattgggtcta gtcttaaatgg ccttctttttt ggtagcttgt	60
gtaaatcagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg	120
gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggg ttgtgatagt	180
aaattatata cccttcctaa acgctatgat gctgttaagc gtgtggggtt acccatgaat	240
cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta	300
caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatgggtt tttgaactta	360
cgaagtgttg agggcatgta ccagtctatt gatgatttag ggaacctttt ccaacgtcaa	420

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caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa 480
cgcaagggga agaaaaagcc taaagtgcct attccttatgg gcttgccagg tagttatttg 540
gtggcgacga accaatctta tgtagggaat cttttggact tggcaggtgg tgagaatggt 600
tatcagtcag atgagaaaaga atttctatca gttaatcctg aagacatgct agctaaggag 660
cctgacttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac 720
aaagaatttg ctgaaaatga tattttgaaa catttttacgg cagtcaagga agggaaaagtc 780
tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg 840
gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa 885

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<210> 38

<211> 294

<212> PRT

<213> Streptococcus pyogenes

<400> 38

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Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Val Leu Met Ala Phe Phe
1           5           10           15
Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu
          20           25           30
Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
          35           40           45
Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
          50           55           60
Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65           70           75           80
Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
          85           90           95
Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
          100          105          110
Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
          115          120          125
Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
          130          135          140
Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145          150          155          160
Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
          165          170          175
Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
          180          185          190
Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
          195          200          205
Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
          210          215          220
Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225          230          235          240
Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
          245          250          255
Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
          260          265          270
Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
          275          280          285
His Val Gly Asp His Pro
          290

```

<210> 39  
 <211> 885  
 <212> DNA  
 <213> Streptococcus pyogenes

<400> 39  
 atgataaaac gatgtaaagg aattggtcta gtcttaatgg ccttcctttt ggtagcttgt 60  
 gtaaatacagc accctaaaac ggctaaagag actgaacagc agagaattgt agccacttcg 120  
 gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggg ttgtgatagt 180  
 aaattatata cccttcctaa acgctatgat gctgttaagc gtgtggggtt acccatgaat 240  
 cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta 300  
 caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatgggtt tttgaactta 360  
 cgaagtgttg agggcatgta ccagtctatt gatgatttag ggaacctttt ccaacgtcaa 420  
 caagaagcaa aagaattgcg ccagcaatac caggactatt atcgtgcttt ccaagctaaa 480  
 cgcaagggga agaaaaagcc taaagtgcct attcttatgg gcttgccagg tagttatttg 540  
 gtggcgacga accaatctta ttaggggaat cttttggact tggcagggtg tgagaatgtt 600  
 tatcagtcag atgagaaaga atttctatca gttaatcctg aagacatgct agctaaggag 660  
 cctgacttga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac 720  
 aaagaatttg ctgaaaatga tatttggaac cattttacgg cagtcaagga agggaaagtc 780  
 tatgatttgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg 840  
 gacaccttaa cacagctttt tgaccacgtg ggagatcatc cgtaa 885

<210> 40  
 <211> 294  
 <212> PRT  
 <213> Streptococcus pyogenes

<400> 40  
 Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Val Leu Met Ala Phe Phe  
 1 5 10 15  
 Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu  
 20 25 30  
 Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp  
 35 40 45  
 Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr  
 50 55 60  
 Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn  
 65 70 75 80  
 Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser  
 85 90 95  
 Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp  
 100 105 110  
 Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln  
 115 120 125  
 Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys  
 130 135 140  
 Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys  
 145 150 155 160  
 Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro  
 165 170 175  
 Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu  
 180 185 190  
 Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe

```

      195              200              205
Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
      210              215              220
Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225              230              235              240
Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
      245              250              255
Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
      260              265              270
Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
      275              280              285
His Val Gly Asp His Pro
      290

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<210> 41
<211> 885
<212> DNA
<213> Streptococcus pyogenes

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<400> 41
atgataaaac gatgtaaaagg aattgggtcta gccttaaatgg ccttccttttt ggtagcttgt      60
gtgaatcagc accctaaaac ggctaaaagag actgaacagc agagaattgt agccacttcg      120
gttgctgtgg ttgatatctg tgaccgttta aatttagacc tcgttggggg ttgtgatagt      180
aaattatata cccttcctaa acgctatgat gctgttaagc gtgtggggtt acccatgaat      240
cctgatatag agttgattgc ttctttgaaa ccaacttgga ttttgagtcc caattcttta      300
caagaagatt tggaacccaa gtatcaaaaa ttggatactg agtatgggtt tttgaactta      360
cgaagtgttg agggcatgta ccagtccatt gatgatttag ggaacctttt ccaacgtcaa      420
caagaagcaa aagaattgcy ccagcaatac caggactatt atcgtgcttt ccaagctaaa      480
cgtaagggga agaaaaagcc taaagtgcct attcttatgg gcttgccagg tagttatttg      540
gtggcgacga accaatctta tgtagggaat cttttggatt tggcagggtg tgagaatggt      600
tatcagtcag atgagaaaaga atttctatca gctaatactg aagacatgct ggctaaggag      660
cctgatattga ttttacgaac agctcacgcc attccagaca aggtaaaagt gatgtttgac      720
aaagaatttg ctgaaaatga tattttgaaa cattttacgg cagtcaagga agggaaaagtc      780
tatgatattgg acaataccct gtttggcatg agtgctaaat tgaactaccc agaagccttg      840
gacaccttaa cacagctttt tgaccgcgtg ggagatcatc cgtaa      885

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<210> 42
<211> 294
<212> PRT
<213> Streptococcus pyogenes

```

```

<400> 42
Met Ile Lys Arg Cys Lys Gly Ile Gly Leu Ala Leu Met Ala Phe Phe
1              5              10              15
Leu Val Ala Cys Val Asn Gln His Pro Lys Thr Ala Lys Glu Thr Glu
      20              25              30
Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
      35              40              45
Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
      50              55              60
Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65              70              75              80
Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser

```

										85			90			95		
Pro	Asn	Ser	Leu	Gln	Glu	Asp	Leu	Glu	Pro	Lys	Tyr	Gln	Lys	Leu	Asp			
			100			105			110									
Thr	Glu	Tyr	Gly	Phe	Leu	Asn	Leu	Arg	Ser	Val	Glu	Gly	Met	Tyr	Gln			
			115			120			125									
Ser	Ile	Asp	Asp	Leu	Gly	Asn	Leu	Phe	Gln	Arg	Gln	Gln	Glu	Ala	Lys			
			130			135			140									
Glu	Leu	Arg	Gln	Gln	Tyr	Gln	Asp	Tyr	Tyr	Arg	Ala	Phe	Gln	Ala	Lys			
			145			150			155			160						
Arg	Lys	Gly	Lys	Lys	Lys	Pro	Lys	Val	Leu	Ile	Leu	Met	Gly	Leu	Pro			
			165			170			175									
Gly	Ser	Tyr	Leu	Val	Ala	Thr	Asn	Gln	Ser	Tyr	Val	Gly	Asn	Leu	Leu			
			180			185			190									
Asp	Leu	Ala	Gly	Gly	Glu	Asn	Val	Tyr	Gln	Ser	Asp	Glu	Lys	Glu	Phe			
			195			200			205									
Leu	Ser	Ala	Asn	Pro	Glu	Asp	Met	Leu	Ala	Lys	Glu	Pro	Asp	Leu	Ile			
			210			215			220									
Leu	Arg	Thr	Ala	His	Ala	Ile	Pro	Asp	Lys	Val	Lys	Val	Met	Phe	Asp			
			225			230			235			240						
Lys	Glu	Phe	Ala	Glu	Asn	Asp	Ile	Trp	Lys	His	Phe	Thr	Ala	Val	Lys			
			245			250			255									
Glu	Gly	Lys	Val	Tyr	Asp	Leu	Asp	Asn	Thr	Leu	Phe	Gly	Met	Ser	Ala			
			260			265			270									
Lys	Leu	Asn	Tyr	Pro	Glu	Ala	Leu	Asp	Thr	Leu	Thr	Gln	Leu	Phe	Asp			
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Arg	Val	Gly	Asp	His	Pro													
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<213> Streptococcus pyogenes

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Gln Gln Arg Ile Val Ala Thr Ser Val Ala Val Val Asp Ile Cys Asp
           35           40           45
Arg Leu Asn Leu Asp Leu Val Gly Val Cys Asp Ser Lys Leu Tyr Thr
           50           55           60
Leu Pro Lys Arg Tyr Asp Ala Val Lys Arg Val Gly Leu Pro Met Asn
65           70           75           80
Pro Asp Ile Glu Leu Ile Ala Ser Leu Lys Pro Thr Trp Ile Leu Ser
           85           90           95
Pro Asn Ser Leu Gln Glu Asp Leu Glu Pro Lys Tyr Gln Lys Leu Asp
           100          105          110
Thr Glu Tyr Gly Phe Leu Asn Leu Arg Ser Val Glu Gly Met Tyr Gln
           115          120          125
Ser Ile Asp Asp Leu Gly Asn Leu Phe Gln Arg Gln Gln Glu Ala Lys
           130          135          140
Glu Leu Arg Gln Gln Tyr Gln Asp Tyr Tyr Arg Ala Phe Gln Ala Lys
145          150          155          160
Arg Lys Gly Lys Lys Lys Pro Lys Val Leu Ile Leu Met Gly Leu Pro
           165          170          175
Gly Ser Tyr Leu Val Ala Thr Asn Gln Ser Tyr Val Gly Asn Leu Leu
           180          185          190
Asp Leu Ala Gly Gly Glu Asn Val Tyr Gln Ser Asp Glu Lys Glu Phe
           195          200          205
Leu Ser Val Asn Pro Glu Asp Met Leu Ala Lys Glu Pro Asp Leu Ile
           210          215          220
Leu Arg Thr Ala His Ala Ile Pro Asp Lys Val Lys Val Met Phe Asp
225          230          235          240
Lys Glu Phe Ala Glu Asn Asp Ile Trp Lys His Phe Thr Ala Val Lys
           245          250          255
Glu Gly Lys Val Tyr Asp Leu Asp Asn Thr Leu Phe Gly Met Ser Ala
           260          265          270
Lys Leu Asn Tyr Pro Glu Ala Leu Asp Thr Leu Thr Gln Leu Phe Asp
           275          280          285
His Val Gly Asp His Pro
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